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ABSTRACT

This Digest outlines five skills that will increase the likelihood that school counselors interpret test information correctly. These skills are: (1) understanding what norm-referenced tests are and what they do; (2) understanding the properties of a normal curve; (3) knowing the properties of common score types; (4) recognizing the difference between percent and percentile; and (5) being able to translate from one standard score to another. Because of the increased reliance on norm-referenced tests in schools, it is essential that school counselors be able to interpret and explain test results accurately to various stakeholders. These five skills do not guarantee expertise, but do encourage minimum competence in interpreting norm-referenced tests. (SLD)

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David M. Monetti and Kerry T. Hinkle
Valdosta State University

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Five Important Test Interpretation Skills for School Counselors

David M. Monetti and Kerry T. Hinkle
Valdosta State University

School counselors are often asked to administer and interpret norm-referenced tests. Certain fundamental test interpretation skills are necessary to accurately interpret and utilize test data. The purpose of this Digest is to outline five skills that will increase the likelihood that test information is interpreted correctly.

Skill 1: Understanding What Norm-Referenced Tests Are and What They Do

Norm-referenced tests are assessments administered to students to determine how they perform in comparison to others. They are often used to classify students for placement and award purposes (Bond, 1996). One well-known example is the use of the PSAT test for determining participation in the National Merit Scholarship award program. A student's current test performance is compared to that of a representative sample of students, known as a norm group, who were previously administered the test. Norm groups can be used to create either national norms or local norms, depending on who is included in the normative sample.

Norm-referenced tests have several strengths. For example, Dombrowski (2003) points out that norm-referenced testing often allows for reliable and objective measurement. However, with these types of assessments, it is critical to understand the composition of the norm group (Oosterhof, 2003). It's also important to note that test scores on norm-referenced tests typically rise the longer the test is in use, likely due to changes in instruction or test preparation that are made as educators become more familiar with the form of a test (Linn et al., 1990).

Criterion-referenced and norm-referenced tests yield different, but complementary, pieces of information. Criterion-referenced tests, such as many of the state high school tests, help demonstrate how a student stands in relation to a given educational curriculum. The emphasis is not on comparison with other students, but rather, on mastery of specific content knowledge and skills. Criterion-referenced tests provide useful information about students' strengths and weaknesses in various curriculum areas. It is critical that the content domain of the assessment be clearly defined (Oosterhof, 2003).

Results of norm- and criterion-referenced tests should be combined with other formal and informal data collection methods, since no single set of test scores is adequate to make important educational decisions (Code of Fair Testing Practices in Education, 1988).

Skill 2: Understanding the Properties of the Normal Curve

As previously discussed, in norm-referenced tests, a child's test performance is compared to a norm group. The distribution of test scores generated by the norm group is normal (Popham, 2002). Therefore, understanding what a normal curve is becomes critical for norm-referenced test interpretation. First, a school counselor should recognize that if he or she were to draw a vertical line down the center of the normal curve, the distribution would be divided into two equal halves. Because both halves are identical, statisticians classify normal curves as symmetrical. The vertical line represents the mean, or average, performance of the norm group. With normal curves, this line also represents the median and the mode; however, this is not always true of other types of curves.

Knowing the mean helps the test interpreter to identify the average performance of the norm group, but is not sufficient to correctly interpret an individual's performance on a norm-referenced test. The school counselor also must know how the concept of standard deviation is related to the normal curve. Drummond (2000) indicates that standard deviation is a statistic that defines the spread of scores around the mean. Standard deviation helps determine how far above or below the norm group mean an individual's score falls. For practical purposes, the normal curve is divided into three standard deviations above the mean and three standard deviations below the mean. In a normal curve, 34% of individuals fall between the mean and one standard deviation above the mean, 14% of individuals fall between one standard deviation above the mean and two standard deviations above the mean, and 2% of individual fall between two standard deviations above the mean and three standard deviations above the mean. Since the normal curve is symmetrical, the percentages are the same for the standard deviations above and below the mean.

Skill 3: Knowing the Properties of Common Score Types

To accurately and efficiently interpret norm-referenced assessments, school counselors need to be familiar with the properties of common scores they may encounter. Those score types are Z scores, T scores, NCE scores, and stanine scores.

- Z scores have a fixed mean of 0 and a standard deviation of 1. Thus, if a student's test performance is one standard deviation above the mean, the individual has a Z score of 1. If a student's test score is two standard deviations below the mean, his or her Z score is a -2. It is possible (and common) for students to have negative Z scores.
- T scores often have a mean of 50 and a standard deviation of 10. Thus, if a student's test performance is one standard deviation below the mean, the individual has a T score of 40. If a student's test score is at the mean, his or her T score is 50.
- NCE scores stands for normal curve equivalent scores. NCE scores have a fixed mean of 50 and a standard deviation of approximately 21. If a student's test performance is two standard deviations above the mean, the individual has an NCE score of 92. If a student's test score is one standard deviation below the mean, his or her

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NCE score is a 29.

- Stanine scores have a fixed mean of 5 and a standard deviation of 2. The term "stanine" stands for Standard Nine, indicating that the range of stanine scores is fixed from 1 to 9, with 9 representing the highest possible stanine score, and 1 representing the lowest possible score. If a student's test performance is two standard deviations above the mean, the individual has a stanine score of 9. If a student's test score is three standard deviations below the mean, his or her stanine score is a 1. Five is the most commonly assigned stanine score, because it falls directly on the mean of the curve. If a student is assigned a 5, he or she is performing better than half of the norm group on the content assessed on the norm-referenced test.

Skill 4: Recognizing the Difference Between Percent and Percentile

School counselors need to recognize that percent and percentile are different concepts. The term "percent" is an abbreviation of the Latin phrase per centum, which literally means "by the hundred." A percent represents the proportion of test material answered correctly out of a hundred. For example, if an individual took a 50-item test and answered 25 items correctly, the percent he or she got correct would be 50.

Percentiles, according to Drummond (2000), are one of most common tools to help interpret norm-referenced assessments. Percentile scores range from 1 to 99 and tell the test interpreter the percentage of individuals in the norm-group that the test taker outperformed. For example, if a test taker earned a score in the 74th percentile, the interpretation would be that 74% of the norm group performed at or below the test taker's score.

Skill 5: Being Able To Translate From One Standard Score to Another

Once school counselors have developed competency with the four skills addressed above, they will have the tools necessary to quickly and accurately translate scores from one common score type to another. This skill is particularly important when meeting with parents and students to discuss their norm-referenced test performance. School counselors need to be cognizant that parents and students are often confused by the many different score types, the compact layout of many norm-reference score reporting sheets, and most importantly, the interpretation of the scores. This is an opportunity for the informed school counselor to be particularly helpful.

Because the score types discussed above (Z, T, NCE, stanine) are all based on the properties of the normal curve, the scores can easily be converted from one score type to another. By performing test score conversions, the school counselor can demonstrate to the parent(s) and student how the different score types are representative of how the test taker performed in comparison with the norm group. For example, if a student had a Z score of 1, the individual's performance is one standard deviation above the mean. Eighty-four percent of the norm group performed at or below the test taker's score. The student also had a T score of 60, an NCE score of 71, and a stanine score of 7. All of the scores are one standard deviation above the mean. The same is true for students who have scores that fall below the mean. If a student's norm-referenced test score is two standard deviations below the mean, the corresponding Z score is -2, the T score is 30, the NCE score is 8, and the stanine is 1. Table 1 will help translate four common standard score types.

Due to the increased reliance on norm-referenced tests in schools, it is essential that school counselors be able to accurately interpret and explain test results to various stakeholders. While these five test interpretation skills do not guarantee expertise, they are intended to encourage school counselors' minimum competency with regard to norm-referenced test interpretation.

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Table 1. Translating Four Common Standard Score Types

Score Type	3 standard deviations below the mean	2 standard deviations below the mean	1 standard deviation below the mean	Mean	1 standard deviation above the mean	2 standard deviations above the mean	3 standard deviations above the mean
Z	-3	-2	-1	0	1	2	3
T	20	30	40	50	60	70	80
NCE	1	8	29	50	71	92	99
Stanine	1	1	3	5	7	9	9

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